Identifying and Analyzing Critical Success Factors

Let's Not Overlook an Acquisition Strategy That Would Promote Program Management Stability

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The Department of Defense (DoD) has not previously used Critical Success Factors (CSF) for program management. Is it an important enough issue to warrant time and attention? To decide that question, DoD conducted an extensive analysis of the records of success of numerous programs in meeting cost, schedule, and performance.

Referring to this prior analysis, a letter from the Office of the Secretary of Defense, dated Jan. 9, 1997, issued jointly by Dr. Paul Kaminski, then Under Secretary of Defense (Acquisition and Technology), and Emmett Paige Jr., then Assistant Secretary of Defense (Command, Control, Communications and Intelligence), states in the opening paragraph:

"Nearly one-third of information technology (computer and software) projects were canceled before completion. Over half of the project budgets exceeded 189 percent of the original estimate. The average schedule overrun for projects that were in difficulty was 222 percent. And, on average, the delivered product contained only 61 percent of the originally specified features."

This letter addressed only DoD information systems of various kinds. It did not address issues specifically related to the acquisition of large and costly weapon systems such as aircraft, submarines, tanks, and space-based sys-

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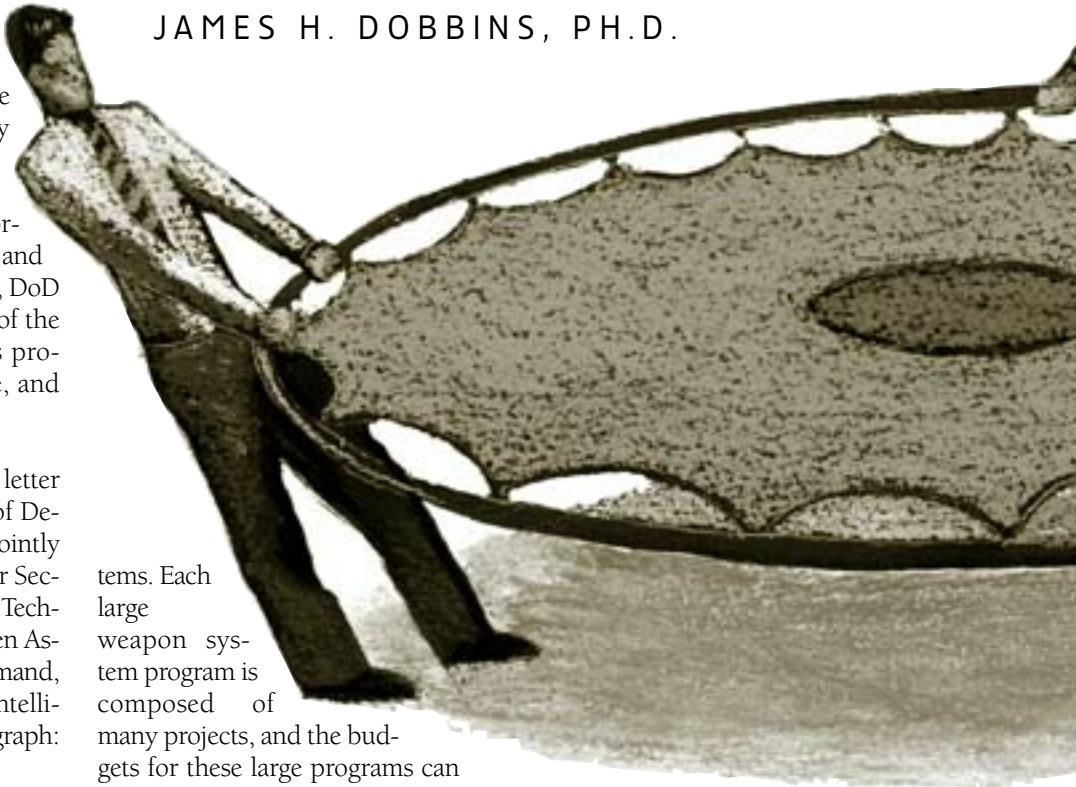
tems. Each large weapon system program is composed of many projects, and the budgets for these large programs can easily run into hundreds of millions, and even billions of dollars. In fact, the budget for just one of these large programs can exceed the annual gross national product of many countries around the world. The cost, schedule, and performance factors on these large weapon system programs tend to dwarf those found in information systems, not to mention the fact that many of the weapon system acquisitions are unprecedented, thus further complicating the acquisition management function and processes.

The acquisition management strategy must be focused on the correct issues or the system will have a high probability of failure to achieve the program goals for cost, schedule, and performance.

All three of these target goals, which are present for every program, are goals that are achieved, or not, depending on the success of the program manager in addressing the program risks.

CSF and Risk Management Directly Linked

Program Management on Department of Defense programs is inherently a process of risk management in the sense that the time from initial concept to first article production of a major weapon system averages 15 years, the budgets for many of these programs are several hundred million dollars, and the performance requirements may change several times prior to production. Since managers depend on correct and relevant information to acquire and use the

knowledge they need to properly manage program risks, successful program risk management and Critical Success Factor analysis are directly linked.

The need for CSF research and application on Department of Defense acquisition programs is clear, for, by their very nature, if the activities identified as Critical Success Factors are not done well, the program will not succeed except by accident.
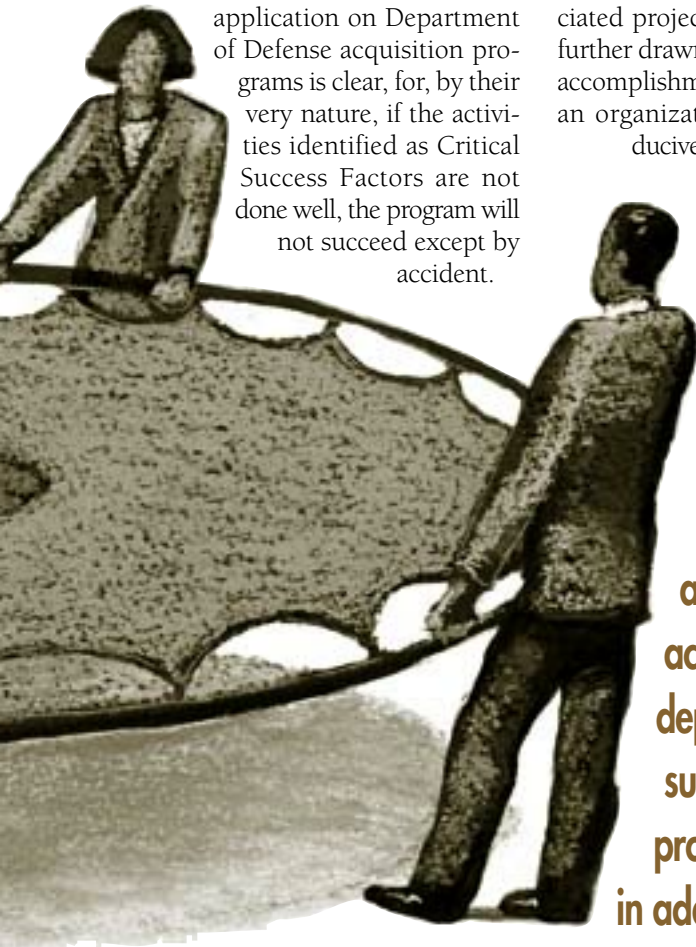
CSF — Large-Scale vs. Small-Scale Projects

Critical Success Factors, as defined by John F. Rockart in the chart to the right, are critical management activities, quite distinct from a set of detailed requirements or specifications that define an acceptable deliverable for a project. Though they are activities that must be successful and are *necessary* to achieve an organization's broad goals, CSF are not necessarily *sufficient* to ensure success of any single project effort associated with these broad goals. Though they are activities *critical* to overall success, CSF are not a statement of *everything* that should be done for eventual success. Because they are activities, they can be tracked over time and measured, and are fundamentally performance-based.

In this sense, a set of CSF identified for a given large-scale program effort differs fundamentally from the set of interlinked, detailed tasks that must be completed satisfactorily in the ordinary course of business for any single associated project. The distinction can be further drawn by noting that successful accomplishment of a set of CSF creates an organizational environment conducive to successful management

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of the associated projects. However, successful management of any one of these individual projects nonetheless requires an appropriate project concept, detailed project plan, and effective execution of the plan to achieve time, budget, specification, and customer satisfaction goals. *Success for any single project is extremely difficult unless the CSF are successfully accomplished.*

Since Rockart introduced his definition, a large body of research on CSF has been conducted. Most of the prior research focused exclusively on CSF identification and did not investigate the three interrelated areas of 1) CSF identification, 2) underlying constraint analysis, and 3) measure identification. Nor did any of the prior research attempt to test the credibility of identified CSF against any defined analysis criteria, especially in a contextual framework. What the research did produce was lists of CSF for project management. The problem was that the different lists, produced by different research tasks, differed in content. Besides some overlap, differences were apparent from one list to the next. Thus, managers faced a dilemma. If they wanted to use CSF, which list should they pick?

A more serious issue was beneath the surface, undiscussed in the research, but always there. Invariably, the question surfaced: *Why do managers have such a hard time using CSF?* The answer had two parts.

• One, by simply adopting a list, managers never learn how to think in terms of CSF, and therefore CSF utility is minimized.

CRITICAL SUCCESS FACTORS

• The limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. They are the few key areas where things must go right for the business to flourish. If results in these areas are not adequate, the organization's efforts for the period will be less than desired.

• Areas of activity that should receive constant and careful attention from management..

(As defined by John F. Rockart in "Chief Executives Define Their Own Data Needs," *Harvard Business Review,* March–April 1979.)

- Two, the lists produced from the research tended to be stated as something other than an activity, and the lists deliberately eliminated any reference to CSF having a contextual flavor. Yet, any valid set of CSF for a manager will always be contextually relevant to that manager.

A Way Out of the Box

So, how do we solve the impasse? If I am a manager, how will I recognize a CSF when I run into one on the street? This is an important question because if I ask any 10 managers to list their CSF — managers who have not been trained to think in terms of CSF — they will most likely list the most recent things with which they had the greatest difficulty. Is there a way out of this box?

Yes, there is a way, and it lies in *process*, not lists. Consider what we face in DoD program management. A large and complex program may have a development cycle as long as 15 years. No program manager can state categorically that the CSF identified at any life cycle point in the program will lead to, or guarantee, final program success. Clearly, on many such programs, the goals and objectives may change over time because of availability of new technology, funding availability and constraints, political realities, changing threats, and many other factors, thereby necessitating a change in the CSF.

What we *can s*ay is that the managers leading the programs at any point in development may identify what they believe to be, at that time, the most significant activities upon which program success depends. The final answer to the question — *Which CSF were necessary for eventual program success?* — has to be examined upon *completion* of the acquisition program. In the interim, as the program advances toward completion and since each program has several intermediate milestones, CSF analysis can be conducted at several points and adjusted as necessary.

Why is *Process* Important?

Lists of CSF given to a manager clearly were not particularly helpful. However,

developing a process by which managers could identify their CSF, determine the constraints on which each critical success factor is based, and determine the measures for each, would be very useful. Why? Because the process itself teaches managers how to think in terms of CSF. Because it *is* a process, once the process is learned managers can apply it to any other management job to which they are assigned. The generalization is in the process, not in a list.

If it turns out that several different managers within a given domain area each identify some common subset of CSF, certainly that knowledge is very helpful, but not essential for any individual manager's success. What managers have to know is their *own* CSF and a process to help them identify and manage to those CSF.

Just as is sometimes done by their civilian counterparts, many of the more skillful program managers intuitively determine CSF rather than rely on standard information from their own Management Information System (MIS) to manage programs. However, where the CSF are not explicitly identified and recorded, they do not become a part of the program history and are not explicit elements of the management reporting process. Furthermore, the underlying constraints for the CSF do not command attention, and the CSF are seldom measured.

A successor program manager, given his or her own skill level and background, may be more or less capable of identifying CSF or may focus on a different set of intuitively perceived CSF, if indeed any at all. The result is that a given acquisition program may encounter wide swings in managerial focus and direction due to the particular skills and backgrounds of the different program managers who will attempt to guide the program to completion, each of them attempting to integrate and manage complex information related to as many as 11 different functional disciplines. In the program management office, there may be a different person responsible for each of the different disciplines, with each person responsible for providing

critical information on that discipline to the program manager.

In the absence of an active and continuous process of identification of the program CSF, this is all done without any documented continuity of those activities critical to program success — activities that *should* be documented as an important part of the program's history. This is further exacerbated in Department of Defense programs by the almost routine turnover of military program managers. Because of this high turnover rate, it would be highly beneficial to a program:

- if the CSF were explicitly identified at the program manager level;
- if the criticality of the identified CSF were validated; and
- if the identified and validated CSF were used as a foundation for the acquisition management process for the program, used to establish the data reporting requirements for successively lower levels of management, and then measured in each instance (quantitatively or qualitatively).

Once explicitly identified and available to successor program managers, with the underlying constraints clearly and explicitly stated, the information gathered by such a process would go far in promoting program management stability and in alleviating the adverse effects of program manager discontinuity. Once a set of CSF has been explicitly identified and communicated, the likelihood that it will be ignored becomes minuscule. Therefore, establishing clear CSF to support the acquisition management of large defense programs would be a significant element of eventual program success.

Scratching Beneath the Surface

My personal research into developing a process model for CSF identification and analysis, conducted as part of my dissertation at George Washington University in November 1999, surfaced some unexpected results:

One of the managers interviewed, having already been briefed on the process and given relevant background on Crit-

ical Success Factors, was asked how many CSF he associated with his program. He answered between 40 and 50 CSF, and indicated he knew that number was too high to manage effectively. As he assisted in the production of the final report, saw how the process worked, and saw that everything could be covered within the scope of six CSF, he said for the first time he was confident he could get the job done. He was also somewhat surprised that this all happened with information he had provided, and that the interviewer had not contributed any new information to cause this realization.

Four of the Program Executive Officers (PEO) responsible for the programs studied were asked to evaluate the information. Responses were received from the San Diego Space and Naval Warfare Systems Command (SPAWAR) PEO, Navy Rear Adm. John A. Gauss, and from Air Force Lt. Gen. Robert Raggio, located at Wright-Patterson Air Force Base. Each of their responses acknowledged that military program managers engage in risk management as a normal part of their activity, and they examined the CSF analysis process from the perspective of whether it would be value-added to the existing risk management processes. Their responses are revealing:

Raggio

"The CSF analysis appears to be a useful way to create a common understanding of what the members of a team need to concentrate on to achieve program success. This is particularly important with a large complex program and a large multilevel, geographically dispersed program team. CSF and the analysis to define them are a good way to focus a cross-functional team on a common agenda and ensure that everyone is applying their best effort where it is most important. In answer to your question, I agree that it would be advantageous to include education in CSF analysis as a part of a wider program management curriculum at DSMC."

Gauss

"The use of CSF seems like one piece of an overall effort to manage risk. However, it is one of the first and most important steps to take in order to build a successful risk management program. It appears that a CSF analysis would have merit for project managers. Any successful project manager does a CSF analysis informally anyway. We identify what is critical to the success of our project and prioritize our efforts to make sure that happens. The CSF methodology that Professor Dobbins is advocating appears to give a formal framework to achieve this. Establishing the right data to measure and the proper monitoring process is critical. This data varies by program and magnitude. The data and CSF must be data that is generated by the production level of the organization and something they buy into."

An examination of these independently provided statements shows that they are not only consistent with each other, but confirm the premises of the research, namely: successful managers do indeed identify CSF informally; it would be advantageous to have a formal process for doing this; and it would be advantageous to make education in this process a part of program management education. The independent evaluation by these experienced managers supports the foundation premises for this research, and is consistent with the following conclusions.

- The program managers who participated in the research were, with the aid of the researcher, able to effectively apply the CSF Process Model to their situations, were able to define their contextually relevant CSF, and were able to formulate those CSF in terms that make them both immediately usable and measurable.
- Each of the managers, with the aid of the interviewer, was able to state each critical success factor in terms of an activity and was able to define measures for each factor. None of the CSF identified are ambiguous or at such a level of abstraction that additional effort is required for CSF to be applied to the program.
- Since each manager interviewed has complete control of the final statement of the CSF and the measures,

no interviewer bias is interjected nor is there any interpretation in defining the CSF or the associated measures.
- Each manager understood the process, felt comfortable with the process, and understood the results. Each also understood they had the freedom to change any of the candidate CSF and indicated a willingness to do so if they felt it was necessary.
- The responses from the PEOs are insightful beyond the level of being a polite or merely supportive statement. For example, Raggio indicated the CSF analysis process should be a part of the education process for program managers. Given that the educational process for program managers is intense; complex; and takes time, effort and financial resources to accomplish, this PEO is, in effect, saying he is willing to back his statement with commitment of meaningful resources.

We see a similar response from Gauss who stated that the CSF analysis process is the first, and most important step in building a successful risk management program. In effect, he is not only willing to support the educational objective, but has concluded that this process is the first and most important step in developing a comprehensive and integrated risk management program.

These statements do not provide absolute certitude, but do give another and independent view by those whose competency and expertise are well known, who have a vested interest in the programs' success, and who served as program managers prior to becoming PEOs. They therefore understand the responsibilities involved as well as the particular programmatic issues, and have given this qualitative evaluation of value.

The question we now must answer is: *Does the user community support inclusion in the DAU executive curriculum of a short course for program managers in CSF identification and analysis?*

Editor's Note: Dobbins welcomes questions or comments on this article. Contact him at *jim.dobbins@dau.mil.*